

**What is Claimed:**

1. A method for determining a user's Respiratory Quotient (RQ), comprising the steps of:  
    measuring the user's real-time inspired O<sub>2</sub> concentration (INS O<sub>2</sub>) and end tidal O<sub>2</sub> concentration (ETO<sub>2</sub>);  
    measuring the user's real-time inspired CO<sub>2</sub> concentration (INS CO<sub>2</sub>) and end tidal CO<sub>2</sub> concentration (ETCO<sub>2</sub>); and  
    determining the user's RQ from the measured INS O<sub>2</sub>, ETO<sub>2</sub>, INS CO<sub>2</sub>, and ETCO<sub>2</sub> values in accordance with the following equation:  
$$RQ = (ETCO_2 - INS\ CO_2) / (INS\ O_2 - ETO_2).$$
2. The method of claim 1, wherein the measurement steps are performed while the user is in a resting condition.
3. The method of claim 2, wherein ETCO<sub>2</sub> is measured as the maximum CO<sub>2</sub> value in a breath cycle of the user.
4. The method of claim 2, wherein INS CO<sub>2</sub> is measured as the minimum CO<sub>2</sub> value in a breath cycle of the user.
5. The method of claim 2, wherein ETO<sub>2</sub> is measured as the minimum O<sub>2</sub> value within a breath cycle of the user.
6. The method of claim 2, wherein INS O<sub>2</sub> is measured as the maximum O<sub>2</sub> value within a breath cycle of the user.
7. The method of claim 2, wherein values of INS CO<sub>2</sub> and ETCO<sub>2</sub> are determined by analysis of a CO<sub>2</sub> waveform of a breath cycle of the user.
8. The method of claim 7, wherein values of INS O<sub>2</sub> and ETO<sub>2</sub> are determined by synchronizing timing of an O<sub>2</sub> waveform of a breath cycle of the user with the CO<sub>2</sub> waveform and sampling INS O<sub>2</sub> and ETO<sub>2</sub> values simultaneously with sampling of complementary CO<sub>2</sub> values determined by maximum and minimum value analysis of the CO<sub>2</sub> waveform.

9. The method of claim 2, wherein the steps of measuring ETO<sub>2</sub> and ETCO<sub>2</sub> comprises the step of measuring ETO<sub>2</sub> and ETCO<sub>2</sub> in an exhaled breath of a patient, whereby the breath has been held for approximately 5-10 seconds prior to exhalation.
10. A device for determining a user's resting Respiratory Quotient (RQ), comprising:
  - a CO<sub>2</sub> sensor that measures the user's real-time inspired CO<sub>2</sub> concentration (INS CO<sub>2</sub>) and end tidal CO<sub>2</sub> concentration (ETCO<sub>2</sub>);
  - an oxygen sensor that measures the user's real-time inspired O<sub>2</sub> concentration (INS O<sub>2</sub>) and end tidal O<sub>2</sub> concentration (ETO<sub>2</sub>); and
  - a processor that determines the user's RQ from the measured INS O<sub>2</sub>, ETO<sub>2</sub>, INS CO<sub>2</sub>, and ETCO<sub>2</sub> values in accordance with the following equation:
$$RQ = (ETCO_2 - INS\ CO_2) / (INS\ O_2 - ETO_2).$$
11. The device of claim 9, further comprising a facemask connected to a breathing adapter and adapted to sample the user's inspired and expired respiratory gases.
12. The device of claim 10, wherein the CO<sub>2</sub> sensor and oxygen sensor are disposed on the breathing adapter in a mainstream system configuration.
13. The device of claim 10, further comprising a tube that carries gas samples from the facemask to the CO<sub>2</sub> sensor and the oxygen sensor configured in a sidestream system configuration.
14. A device for determining a user's resting Respiratory Quotient (RQ), comprising:
  - a facemask adapted to received gases inspired by a user and gases exhaled by the user;
  - a CO<sub>2</sub> sensor that measures the user's real-time inspired CO<sub>2</sub> concentration (INS CO<sub>2</sub>) and end tidal CO<sub>2</sub> concentration (ETCO<sub>2</sub>);
  - an oxygen sensor that measures the user's real-time inspired O<sub>2</sub> concentration (INS O<sub>2</sub>) and end tidal O<sub>2</sub> concentration (ETO<sub>2</sub>);
  - a processor that determines the user's RQ from the measured INS O<sub>2</sub>, ETO<sub>2</sub>, INS CO<sub>2</sub>, and ETCO<sub>2</sub> values in accordance with the following equation:
$$RQ = (ETCO_2 - INS\ CO_2) / (INS\ O_2 - ETO_2);$$
 and
  - an airway tube connected to the facemask so as to direct exhaled gases to said CO<sub>2</sub> sensor and said oxygen sensor for measurement.